

1. (AMENDED) A method of enhancing evacuation of a multiple-ply bag of the pillow bag type, the pillow bag including a seam at least partially about a circumference of the bag and including at least two upper plies and at least two lower plies, the plies being of substantially identical dimension and being sealed together at respective edges by the seam, regions between the upper plies being sealed off from respective regions between the lower plies, the pillow bag containing a bulk material and including an exit region from which the bulk material can flow from the bag, the method including the steps of:

connecting a region between two plies of the multiple-ply bag to a source of pressurized air;

emptying the viscous contents of the bag from the exit region; and allowing pressurized air from the source of pressurized air to inflate the region between the two plies when enough of the contents of the bag has been emptied that a pressure exerted on an inner of the two plies by the pressurized air is greater than a pressure exerted on the inner of the two plies by the contents, the inner of the two plies thereby urging the contents toward the exit region of the bag.

2. (AMENDED) The method of claim 1 wherein the method further includes placing the bag in a rigid container before filling the bag with the viscous contents.

3. (AMENDED) The method of claim 2 including using a bag that is substantially larger than the rigid container so that excess bag material is present when the bag is filled and is in the rigid container.

4. (AMENDED) The method of claim 3 including arranging the bag so that more excess bag material is disposed away from the bag exit port.

6. (AMENDED) The method of claim 1 including connecting the bag to a source of pressurized air, the pressurized air having a desired pressure the value of which depends on a yield strength of a material used to make the plies, a total thickness of the plies, and a smallest diameter of the bag when the bag is expanded.

7. (AMENDED) The method of claim 1 including forming an air input conduit and:

connecting a first end of the air input conduit to a lower region of the bag so that air traveling through the conduit can enter a region between the two lower plies; and
connecting a second end of the air input conduit to a source of pressurized air.

9. (AMENDED) The method of claim 2 wherein the bag is arranged in the rigid container such that folds of excess material from collapse of the emptying bag are pulled taut as the region plumps, thereby at least significantly delaying blockage of the exit region by bag material.

10. (AMENDED) An arrangement enhancing output of viscous contents of a bag including:

an air input port formed on a multiple-ply bag, the multiple-ply bag including a plurality of plies of substantially identical perimetral extent, at least one edge of each ply being joined to at least one respective edge of another ply, the air input port being connectable to a source of pressurized air;

an interply region between two plies of the plurality of plies of the bag with which the air input port is in fluid communication so that the interply region can fill with pressurized air from the source of pressurized air when the source of pressurized air is connected to the air input port;

a portion of the bag acting as a bottom of the bag;

a drain region of the bag located proximate to the bottom of the bag; and

an inner of the two plies having a bottom part at least partially overlying the bottom of the bag and being arranged so that an increasing portion of the bottom part of the inner ply can become a wall part of the inner ply substantially non-parallel to a the bottom of the bag to increase a depth of the bulk material remaining in the bag in the drain region.

16. (AMENDED) A method of using the bag of claim 10 including the steps of:

connecting a first end of an air input conduit to the air input port of the bag after the bag has been filled with bulk material;

connecting a second end of the air input port to the source of pressurized air so that pressurized air can travel through the air input conduit to the interply region; and
allowing pressurized air to enter into fluid communication with the interply region via the air input conduit and the air input port so that a bottom portion of the inner ply can urge the bulk material toward the drain region of the bag.

17. (AMENDED) The method of claim 16 wherein the bag is arranged in a rigid container and the drain region of the bag is substantially peripherally disposed in a bottom of the rigid container.

18. (AMENDED) The method of claim 16 wherein the bag is disposed in a rigid container and the drain region of the bag is disposed in a bottom central region of the bag.

19. (AMENDED) The method of claim 16 including withdrawing the bulk material from a dip tube extending to the drain region.

20. (AMENDED) The method of claim 16 wherein the step of connecting the second end is performed when the bulk material reaches a level at which pressurized air can inflate the interply region and cause the inner ply to urge the bulk material toward the drain region.

22. (AMENDED) A method of enhancing evacuation of a multiple-ply, bulk material-filled bag including a plurality of plies substantially identical to each other in dimension, at least one edge of each ply being joined to a respective edge of at least one other ply, the method including the steps of:

connecting a region between two plies of the bag to a source of pressurized air, one of the two plies being an inner ply and another of the two plies being an outer ply; and

inflating the region between the two plies with pressurized air from the source of pressurized air, the region extending under the bulk material, the pressurized air causing the inner ply of the two plies to urge the bulk material toward an exit region of the bag.

a9 24. (AMENDED) The method of claim 22 wherein the bag is a pillow bag comprising at least two bottom plies arranged respectively above and below the region.

27. (AMENDED) The method of claim 22 wherein the step of inflating induces a slope in the inner ply so that a portion of the inner ply near the exit region is lower than a portion of the inner ply distant from the exit region.

28. (AMENDED) A method of using the arrangement of claim 10 including the steps of:

a10 filling the bag with viscous contents;
connecting the air input port to a source of pressurized air; and
accessing the drain region to allow the viscous contents to exit the bag, a portion of the inner of the two plies farthest from the drain region and highest relative to the bottom of the bag plumping in response to pressurized air from the source of pressurized air, the plumping portion of the inner ply thereby pulling the bottom part of the inner ply and causing it to increase its slope so that the increasing portion of the bottom part of the inner ply becomes the wall part.

29. (AMENDED) A method of enhancing outflow of viscous contents of a multiple-ply bag, the bag including at least two plies all of substantially identical dimension, the method including the steps of:

pulling an inner ply of two plies of the bag;
changing part of the inner ply from being part of the bottom of the bag to being a movable wall a portion of which is substantially perpendicular to the bottom of the bag;
moving the movable wall toward an outflow region of the bag; and
urging viscous contents of the bag toward the outflow region.

a11 31. (AMENDED) The method of claim 30 further including inflating the interply chamber by exposing the interply region to pressurized air from the source of pressurized air and outflowing the viscous contents of the bag so that, when a pressure balance on the inner ply created by the contents and the pressurized air allows, air enters the interply region.

Q12 37. (AMENDED) The method of claim 33 wherein the step of forming the air input port includes inserting the air input port between two plies of the bag so that the air input port is in fluid communication with the interply region and with an exterior of the bag.

39. (AMENDED) A system for evacuating semi-flowable bulk material from a multi-ply bag arranged within a shipping container, the system comprising:

Q13 an air input passageway extending to an interply region of the bag that extends under liquid contained within bottom plies of the bag supported on a bottom of the container;
the interply region of the bag being configured to contain pressurized air accumulating initially in regions remote from an output for the bag and to exclude the pressurized air from substantial upper regions of the bag; and
the bag being configured and located within the container so that pressurized air within the interply region counteracts liquid pressure within the bag to raise a ply of the bag against the bulk material in regions remote from the output, thereby urging bulk material toward the output and increasing bulk material depth so that folds of material collecting from bag collapse ride on the surface of the bulk material, the surface of the bulk material being maintained at a level above the output by the raised ply of the bag in the interply region, thereby preventing blockage of the output by the folds of material.

Q14 42. (AMENDED) The system of claim 39 wherein the plies defining the interply region are held together at junctures that guide the manner in which air accumulates at locations in the interply region remote from the output.

43. (AMENDED) The system of claim 42 wherein said junctures are mechanically created by physically pressing together the plies defining the interply region.

Q15 45. (AMENDED) The system of claim 44 wherein said shaped elements are attached to a conduit extending upward from the output.

46. (AMENDED) The system of claim 42 wherein said junctures are created using adhesives to join together the two plies defining the interply region.

47. (AMENDED) The system of claim 42 wherein said junctures are created using heat sealing to join together the two plies defining the interply region.

48. (AMENDED) A combination of a shipping container and a multi-ply bag arranged within the container for holding a semi-fluid material within the multi-ply of the bag for shipment with the container, the combination comprising:

an air inlet arranged in communication with an interply region of the bag extending below an equator of the bag and underneath the material contained within the bag;

seams of the bag being configured to contain within the interply region low pressure air pumped into the interply region and to substantially exclude the low pressure air from a top region of the bag; and

the interply region being arranged to be balloonable in regions remote from a drain region of the bag so that air pressure ballooning the interply region of the bag counteracts material pressure applied in a bottom region of the bag to displace the material toward the drain region;

49. (AMENDED) The combination of claim 48 wherein the bag is arranged within the container so that the interply region has more ballooning capability remote from the drain region than adjacent the drain region.

51. (AMENDED) The combination of claim 48 wherein the ballooning of the bag commences when a material level within the bag is low enough so that low pressure air within the interply region can displace the material toward the drain region.

52. (AMENDED) The combination of claim 48 wherein the plies defining the interply region are held together at junctures that guide the manner in which air accumulates at locations in the interply region remote from the drain region.

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53. (AMENDED) The combination of claim 52 wherein said junctures are mechanically created by physically pressing together the plies defining the interply region.

55. (AMENDED) The combination of claim 54 wherein said shaped elements are attached to a conduit extending upward from the drain region.

56. (AMENDED) The combination of claim 52 wherein said junctures are created using adhesives to join together the two plies defining the interply region.

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57. (AMENDED) The combination of claim 52 wherein said junctures are created using heat sealing to join together the two plies defining the interply region.

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58. (AMENDED) In a bulk material shipping container lined with a bag having a drain region from which semi-fluid contents can be withdrawn from the bag, a method of keeping the drain region flooded with contents being withdrawn, for more completely emptying the bag, the method comprising:

applying low pressure air to an interply region of the bag extending below an equator seam of the bag and below the contents within the bag; and

prearranging the bag within the container to provide ballooning room away from the drain region so that as a contents level within the bag lowers, air pressure balloons the interply region of the bag away from the drain region and displaces the contents toward the drain region and keeps the drain region flooded with the contents until the bag is nearly empty.

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60. (AMENDED) The method of claim 58 further including using the bulk material displaced by the interply region to keep bag material from clogging the drain region during withdrawal of the bulk material.

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65. (AMENDED) A container bag having at least two lower plies, which container bag is drained via a top discharge, comprising:
an air-tight interply region formed between the two lower plies;

an air input passageway extending to the interply region for pumping air into the interply region; and junctures between the two lower plies within the interply region guiding the manner in which air entering the interply region accumulates.

66. (AMENDED) A container bag as described in claim 65 wherein said junctures cause air entering the interply region via the air input passageway to accumulate first at locations remote from a drain region.

67. (AMENDED) A container bag as described in claim 65 wherein said junctures are mechanically created by physically pressing together the plies defining the interply region.

69. (AMENDED) A container bag as described in claim 68 wherein said shaped elements are attached to the top discharge.